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object (or situation) which originally called out the emotional response and the object (or situation) to which it was transferred?

In conclusion I wish to say that I am not attempting to launch criticisms at the head of the psychopathologist. If his terminology is involved it is the fault really of psychology, since he perforce had to use the concepts which psychology had developed. I have tried in this paper merely to raise the question whether the psychopathologist can not reshape to some extent his formulation of problems (without doing injustice to the patient) so as to avail himself of biological and behavioristic concepts.

Psychological terminology is, I believe, being fast outgrown. Dunlap's recent inquiry[6] into the definitions of psychological terms shows, I believe, more clearly than I can state, just how little agreement there is among psychologists in the use of common psychological terms. It seems to me to be a mistake for as useful and fascinating a growth as psychopathology to allow itself to become encrusted with the barnacles of an outgrown terminology.

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PHILOSOPHIC FORMALISM AND SCIENTIFIC IMAGINATION[1]

I

THE art of mathematics possesses so compact a neatness, is so harmonious a union of fluidity and rigidity, that it exercises a hypnotic fascination over all types of mind. The philosopher's preoccupation with it, since Pythagoras, his abortive attempts to impart its form to his themes, are notorious. It manifests such a magic precision, such an ineluctable definiteness, such a so-ness, that the uninitiate stand in awe, and the initiate find it the quintessence of those conditions which satisfy our sentiment of rationality: it supplies activity without frustration, plurality without confusion, unity without monotony. As Mr. Bertrand Russell says, "Mathematics take us still further from what is human, into the region of absolute necessity, to which not only the actual world, but every possible world, must conform; and even here it builds a habitation, or rather finds a habitation eternally standing where our ideals are fully satisfied and our best hopes are not thwarted." Again: "the world of pure reason

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[6] Knight Dunlap, "The Results of a Questionary on Psychological Terminology," *Johns Hopkins Circular*, 1916, No. 5.

[1] A review of "The Concept of Consciousness." Edwin B. Holt. London: George Allen and Company, Ltd. 1914. Pp. xix + 343.

[*i. e.,* of mathematics] knows no compromise, no practical limitations, no barrier to the creative activity embodying in splendid edifices the passionate aspirations after the perfect from which all great work springs. Remote from human passions, remote even from the pitiful laws of nature, the generations have gradually created an ordered cosmos where pure thought can dwell as in its natural home, and where one, at least, of our nobler impulses can escape from the dreary exile of the actual world.''

Mr. Russell, it happens, is not merely a philosopher writing about mathematics. He is also a mathematician writing philosophy. It is to his labors that neo-realism is indebted for its precisian formalism and its dogmatic bias. His passionate utterance, therefore, is something, willy-nilly cathedral for a school become fanatic about ``absolute necessity, to which not only the actual world, but every possible world must conform.'' The mood is not limited to the school, however. It is the mood of all metaphysical sects as well, being but the exteriorization of that inward passion for unity or consistency, of the ``logical motive'' in human nature, of whose self-defeating explication the systems of tradition are the striking outcome. A mere pragmatist like myself might point out that there was nothing sacrosanct about this motive and its satisfactions, that it might be accounted for in terms of definite vital needs and operations, that it is pervasive, that mathematics and philosophy are merely aristocratic arts using highly specialized media, but otherwise typical enough of the common appetites of our common nature. But then I should be told that I exhibit very little understanding of the ``logical motive,'' so I am tempted to desist. I note curiously, however, that Mr. Russell's sense of form and of absolute necessity does not seem to operate when he is honestly facing data and seeking to account for existence, that the gospel of the logic of mathematics is preached in other fields than mathematics by quite other men, and that neo-realism, in so far as it is really a systematic metaphysic, has its St. Paul as well as its Jesus. Thus the organizer of neo-realistic salvation seems to be Mr. Holt.

Mr. Holt appears to possess what Mr. Russell has so far not manifested, a scientific and romantic, as against a formal, imagination, an imagination alive to the experiences of the laboratory and the motives of men. The combination of this imagination with the logical passion and the slang of philosophical mathematics has resulted, at his hands, in a genuine system which throws the living world into a fresh perspective and enriches the tradition with a new world-picture. The manner of it, if one bear in mind the futurism of Bergson, is distinctly cubistic, and ``the neutral mosaic'' which is the total of Being in Mr. Holt's thought is a conception that leads the mind perforce to ``the nude walking down the staircase.'' For in that picture, you see, there really isn't any nude and there really isn't any staircase: there are only angles of illumination meeting other angles of illumination in specific ways; and if you observe the meeting in one of those specific ways, you have a nude walking down a staircase, but if you observe it in another of the specific ways, you have a staircase walking up a nude. The difference derives from the relations, not the terms: the terms are neither nude, nor staircase; they are purely neutral angles of light.

I do not wish to appear to put the position with undue levity. The analogy seems to me to express adequately the problem which Mr. Holt's intention and procedure raise. His intention is to deduce consciousness from a few elemental somethings that are not consciousness. His procedure is to develop it from a few primitive logico-mathematical postulates that "imply it," just as the triangularity of a triangle implies that the sum of its angles is equal to two right angles. In doing so he borrows his units from logic; whatever is, must be a term, or a relation, or a proposition: he traverses the whole expanse of existence, in its depth and in its breadth: he reviews and summarily dismisses most of the historic portraits of the universe he does not like: he reinterprets and makes use of a number of postulated conceptions, such as "logical change," "specific response," and "universal," in a fresh and exciting way. Withal, he manages to keep close enough to the data of the laboratory to give his speculations the air of factual plausibility as well as consistency, and he does it in a manner somewhat staccato and shrill, but lively and colorful enough to make it a style. When you have mastered his rather perverse vocabulary and have learned to know the usual things by their new unusual names, you find a really intelligible vision which adds a new dimension and a liberating perspective to the actualities of the daily life, like a landscape in a dining-room.

Nature appears in this perspective as a self-generating hierarchy, moving from the simple to the complex; from the one or the few, to the many; from the "neutral" to the psychical and material; from the indifferent to the valuable. It has a structure which the order of the sciences echoes. For they also move from simple to complex and constitute a deductive hierarchy, wherein the series from colors, sounds, and the other secondary qualities, through geometry, mathematics, physics, chemistry, geography, astronomy, biology, psychology, sociology, economics, the theory of values, all derive from the simple entities of logic, which are the walls of the world and the foundations of reality. They constitute an asymmetrical deductive series, of which the more complex presupposes the less complex, equivalent to it in being and dependent upon it for its distinguishing traits. Consciousness, the domain of psychology, belongs to the most complex and superficial of the syntheses of neutrals, so that the definition of the "concept of consciousness" is impossible in terms less than the whole metaphysical system from which it is to be "deduced." That system is implied, but not achieved. Mr. Holt is perforce compelled to content himself with deducing consciousness from those "entities in the neutral series that are simpler and more fundamental than minds," that "immediately precede in point of simplicity." Now there exist "physical objects—organic and inorganic entities, both living and dead." These are composed of simpler, neutral entities. They environ the living organisms which respond specifically to some of their neutral constituents and not to others. Such response delimits a field of neutral beings which compose a definite and particular "cross-section" of that being. The field so delimited is consciousness. "In fine the consciousness that depends on any given living organism is the sum-total of all neutral entities to which that living organism responds, and it is the system of these entities in just such and such quantity and just such and such spatial and temporal arrangement of the environment as the responses themselves define."

II

The character of Mr. Holt's method and the significance of his deductions cause the validity of this definition to depend inevitably upon the validity of the concepts from which it is generated. His dialectic seems to me to support its whole movement upon the three notions: (1) "logical activity," (2) "universal," (3) "specific response." These are his fundamental postulates. Without them the differentiating dogmas of neo-realism, declaring consciousness to be an external relation and thought and thing numerically identical, could not emerge. They are the "indefinables" of the system, and their compatibility and validity determine that of the system. For this reason I shall consider them alone, and in the order named, rather than the system as a whole.

1. "Logical activity," Mr. Holt writes, "does not of course involve time; but time involves it, being a special case thereof." What is called "logical necessity" is similarly derivative and secondary, designating merely the correspondence between the thinker and that which is and always was. "Given a surface and the formula of any curve, however complicated, and the entire curve forthwith *is*: and the geometer follows after with his deductive thought to learn what this is." But what is an activity such that antecedent and consequent are simultaneous? Not, obviously, one involving what is usually meant by activity—duration and change, a strain of succession between the prior and the subsequent. It is identical with what is ordinarily meant by "implication." A proposition and its implicates are simul-

taneous and instantaneous. One implies and posits all; all imply and posit one. The mere being of "simples" is thus necessarily coincident with their combination into all sorts of complexes. There can be no possibilities, no potentialities in Mr. Holt's world. All is actual, the water which may result from the still uncombined hydrogen and oxygen, the chicken from the still unhatched and perhaps never to be hatched egg. Activity, change, time, in the usual signification of these terms are purely illusions, being definable by means of instantaneous and simultaneous relations of *before* and *after* (Royce, *idem*) merely, in which things past and things to come stand to each other from all eternity. The geometer *following* "with his deductive thought" is unthinkable in a world that merely *is*. Contradiction, in the discussion of which Mr. Holt has shown much acumen and originality as well as perversity, is no less impossible, and with it error of the Holtian kind, and other things dear to the neo-realists. For Holt insists that contradictions *emerge,* that they are not instantaneous, but eventual: "a set of contradictory propositions need not be utterly contradictory; it may generate a considerable system of terms in relation before the contradiction is at all manifest, as is shown by the fact that the logician often proceeds for some time in the deduction of a system of terms in relation from a set of postulates, until at some point the propositions *meet* in contradiction. Nor is it through any error of deduction that the contradiction was not earlier." Earlier! Logically or temporally earlier? Surely "logical priority" is temporal instantaneity, yet if the phrases quoted mean anything, they mean that there has been a lapse, a stretch, and that something which was not, has become. Holt's notion of activity, in a word, shifts from the meaning he assigns it to the meaning it ordinarily has, and its use to designate real processes, such as the emergence of contradictions does greater credit to his common-sense than his consistency. Observation of analogous data led Russell to distinguish between relations as terms, and relations as "relating"—*relations inert,* in a word, and relations in action, a distinction ultimately, and ultimate, between *being,* and *doing.* Formally, Holt's procedure not only uses, it requires, this distinction. His assumption is, however, that propositions or relations (he identified the two) are inseparable from their activity. If, on the other hand, he concedes them to be separable, then activity becomes a quality which accrues to propositions independently, a quality entirely detachable from them, contingent and non-implicative: Being, being inert, is self-consistent. The result is a dilemma: either activity can not be the ground of deductive necessity or contradictions are subjective illusions.

The ambiguity of meaning in Holt's use of the term activity is still clearer in his discussion of the knowledge of past time, that is, of memory; and of future time. Since, in his system, the idea and object are identical, present knowledge of a past event can not be anything less than knowledge of an event *going on now.* Similarly, knowledge of the future is the being *now,* of *something which is not yet.* Consequently, past and future either both are and are not, are experienced as ''B-not-B,'' which ''no one ever experienced,'' or there is a genuine difference between knowledge and its object, and *meaning* is an activity other than merely logical implication. Underlying the ambiguity is, of course, a formal staticism, which has denatured activity, and has ignored the genuine character of temporality and substituted for it the spatial relationships of *before* and *after.* Since you can distinguish a row of simultaneous objects as before and after each other, and since this seems all that remains when the *generative process* which so posited the objects is ignored, time gets identified with *nothing but* this spatial series and the epistemological trick is turned. So Noah building his ark has a position ''in'' time ''before'' Caesar building his bridge identically as 2 has a position in the number system before 3 and after 1. *Before* and *after* have thus no other designable content than *in front* and *behind:* ''the relation of the knowledge system to time is precisely what it is to space.'' Proof: you can ignore the temporality of an event and deal with its spatiality. Then you can attribute, without further examination, the discoveries in the one field as traits to the other. Thus, you declare that response to the past is the same as response to distance. You demonstrate the identity by example, so: ''if the auditory stimulus of the name of a person who is dead causes a nervous system . . . to produce tears, it is by no means the mere acoustical energy transmitted to the ear that has done this; but a highly peculiar arrangement of nervous arcs that were so organized by past events, it is so-to-say 'stored stimuli,' which only this peculiar configuration of acoustic energies could now set in action. . . . The present response is then not solely a function of the present stimulus, but of past stimuli as well; it is, and will ever continue to be, a revived response to past stimuli.'' A past stimulus, please note, is one which no longer stimulates. Either, therefore, the past stimuli are identical with and present as ''stored stimuli,'' hence not past at all, or the ''stored stimuli'' are different from the stimuli that *caused* the storing. Whichever be the case, the response is immediate and present to immediate and present stimuli. Otherwise, logic requires us to be responding to the identical stimuli, once directly present, now long past, which moved our quadrumanous ancestors. If this be so, why do we not know those entities as such, and know them, moreover, as *past?*

All in all, the notion of "logical activity" can not be said to yield the neo-realist any advantage. Strict adherence to it does not abolish the traditional distinctions between appearance and reality, thoughts and things; it only stretches the gulf between them wider, redoubling the force of the traditional problems of philosophy. This, however, is the precise eventuality neo-realism seeks to prevent. The difference between appearance and reality, it holds, is *nil;* the difference between thoughts and things is *nil;* the genuine efficacy of causes is *nil.* All being reduces to coordinations of immutable, self-repeated simples; all action to instantaneity of concomitant invariant variations. The world is petrified, and plurality, motion, change, and life have still to be accounted for.

2. What is invoked to account for them, in addition to "logical activity," is the universal. This, with its peculiar relation to the particular, is the second of Mr. Holt's necessary indefinables. The upshot of his exposition may be summarized as follows. What distinguishes a universal from a particular or individual is its constant duplicability, or rather, self-duplication. An individual is a "this and no other," so defined by its position in a system. A universal is not. A universal is, in Royce's phrase, "self-representative, and in such a way that the relations between itself and its otherselves are internal to their terms." This internality is implied in the very law of identity, "A is A" so that the factual character of the universal is the "repetition of identicals." It possesses a "deductive fecundity" and constitutes thereby "the sole *connected meaning* of the 'living' whole." It is a genetic formula which generates the many from itself by repeating itself. Every "proposition" or relation is a universal, the terms it posits being dependent upon it for their being. It is their essence, their "connected meaning," internal to them and constituting them. "And so far as any of the terms are related to one another, it is because their being is not independent, although the terms are distinct, but is *generated* by the logical activity of a proposition." "Universal" and "logical activity" are, it will be seen, coimplicative. I am not sure that Holt's exposition permits us to conceive of any important difference between them. "Logical activity" appears nowhere save as an acting of universals, and the very definition of "universal" requires the notion of activity.

Thus, epistemologically, the red sunset in my dream of a sunset I saw last summer in the mountains is a repetition of the same identical system of propositions that generated the sunset itself. It is not an "idea" of the sunset, nor an image, nor a representation, but the thing itself, more or less. In the world of the physicist the fall of a feather and the movement of the moon are reduplications of the identical generative formula that propelled the apple upon Newton's cranium. Immanent in these diverse items are "eternally valid and simultaneously predetermined aspects" which "you must not confuse with the temporal succession of your verifications of the order." The foregoing quotation is from Royce, whose essay (the Supplementary, at the end of "The World and the Individual") Holt acknowledges as the correct basis for his definition of the "universal." The warning contained in the quotation he ignores, however, as he must, being a realist, and the result is the emergence of self-contradiction, of that B-not-B which "no one has ever experienced" and the possibility of which Holt denies.

For example: two particles, in motion, generated by the logical activity of an identical proposition of dynamics, and repeating this identical like two Dromios, encounter in space. At the point where both motions disappear, contradiction is. Holt speaks of it (pp. 272–279) as if it were mere contradiction or opposition, and not *self*-contradiction: "To be sure the unthinkable does not happen among objects, nor yet indeed does any one subjectively think it; no single particle moves in opposite directions at once, and this is also meaningless. The contradiction is, of course, between *propositions;* which are in the present case expressed as *equations of motion.*" Note the plurals. They indicate that Holt is thinking, not logically, but intelligently. For if his description of the universal and its relation to its instances is correct, then the contradictory equations and propositions are not two but one, not different but identical. In the collision, one and the same dynamic law, confronted with itself as its complete, self-representative double, negates itself. O shade of Hegel! this is what comes from declaring numerical diversity and other diversities irrelevant, and irrelevant they must be, since it is the identical proposition that *operates.* If now as we must further assume, this proposition, being eternal, goes on operating although it has contradicted itself, there is no logical reason why the particle on which it acts should not move in opposite directions at once. This may be meaningless, but it is logical. As Holt does in point of fact prefer meaning something to being logical, his actual treatment of the matter does implicitly assume that the differences—differences in locus, differences in function, differences in origin—are operative and important, because they actually *make* a difference. This being the case, what, once more, becomes of the identity of appearance and reality, of thought and thing?

3. The "thing" is, according to Holt, a more or less complicated aggregate of neutral entities which constitute an object in the physical world when defined by one generative proposition, and an object in the mental world or consciousness when responded to with a specific response by an aggregate defined by another generative propo-

sition so as to mate up a living body with a nervous system. The identical aggregate figures in the two systems at the same time without being in any way altered by either. Its differentia as consciousness is a nervous system's *specific response* to it.

In many ways, this notion of ''specific response'' is begged. It is the last of the necessary indefinables in the Holtian system. Complex as it is, it should have been ''deduced,'' by way of ''logical activity'' and ''universal,'' but it is arrived at empirically, on observational, not imaginative, grounds, and although it logically depends upon, it is treated as coordinate with, those notions, whose chief function in the ''concept of consciousness'' is to serve the demonstration of the immanence of past and future in present knowledge, and of the objectivity of error. ''Specific response'' involves difficulties peculiar to itself.

Holt finds its beginnings in the tropisms of plant-life and its culmination in the simple or complicated reflex movements of animal life. The reflex-arc, which is its ''physiological or functional unit,'' is, in its anatomical essentials, the same in animals and plants. It is the basic mechanism of response, ''further differentiated and wonderfully coordinated in a nervous system.'' Each reflex-arc corresponds strictly and specifically, both alone and in its integration with its fellow reflex-arcs in the nervous system, to definite and specific items of environment. The correspondence is a one-one correspondence, fixed and predeterminate for each and every arc and each and every integration of such arcs. This is why the response is *specific response.* The manner of it constitutes the knowing process.

''Specific response,'' it will be seen, is a concept which extends the field of consciousness to the vegetable world. Stopping with the vegetable world is, however, purely arbitrary. From the reflexes of protoplasm to the reflexes of preprotoplasmic matter, of colloids, of crystals, of what not, is an easy and inevitable step. In fact, the world is just chuck full of specific responses that inanimate entities exhibit toward each other—the specific affinities of chemicals, the specific reverberations of resonators, the specific reflections of mirrors, and so on. Can it then be said that the difference between the vital and the non-vital, the conscious and the unconscious, lies in the specificity of its response to its environment, or in the complexity of the specifications? And inasmuch as the complexity is purely structural, it can hardly be declared to introduce anything new or different. If consciousness is no more than the specific response of one neutral entity or a collection of such to another or to a collection of others, consciousness can not be denied any entity namable. The logical upshot is an inverted panpsychism.

Now an inverted panpsychism is no more than a restatement of the problem. Consciousness being an entity of any kind specifically responded to by an entity of the same or another kind, the definition and identification of that familiar *quale* which science, dialectic, and the daily life know as consciousness, needs still to be made. Its nature and differentiae are not designated by, even though they may have been grounded in, the notion of specific response. Grant that "specific response" is the cause or basis of consciousness, it is as perverting to identify it with consciousness as such as it is to identify the specific response of hydrogen to oxygen with water as such, or ether vibrations with light. Water and light are just what hydrogen and oxygen and ether-vibrations are not; they possess qualitative characters quite different from, and in the very least additive to the latter: and their nature lies in those characters and in nothing else besides.

I can not help thinking, hence, that this bold and imaginative attempt to analyze away the genuine differentiae of consciousness is due not so much to observation as to reaction against the excesses of subjectivism and the clumsy difficulties of representativist theories of knowledge. Reaction against subjectivism has led to a pan-objectivism, in fact to a panic-objectivism, by way of an attenuation of all cases of consciousness to a purely external relation and of the formulation of self-contradictory conceptions of "activity" and "universal." Activity is conceived, as we have noted, as eternalist and static; the universal as self-repetitive, so that the sameness which two instances of a quality or proposition possess is a Platonic sameness. The difficulties of representationism are involved ultimately in psychophysical parallelism. Reaction against that leads to the identification of "thought" and "thing." But neither parallelism nor representationism is escaped in this way. They are merely restated and obscured in new terms. Analysis reveals, as Mr. Lowenthal has shown,[2] a parallelism closely resembling Spinoza's, and a *de facto* dualism in which identity is actually established by an *identification,* such that the content of consciousness is a process of meaning and its object a thing meant. Their eventual coalescence through verification is then defined retrospectively as identity. The slurring is made possible by notions of "universal" and "activity," which enable Holt to regard them as one and not two even when they *are* two, and so to discount their *becoming* one.

I respond, let us say, in memory, specifically, to a certain continental town. There exists then a one-one correspondence between the constituent reflex-arcs of my responsive mechanism and certain predetermined entities of the town's aggregate, which are thereby my consciousness. The relationship is static, coordinative, not causal. Neither I nor the town is altered in any way thereby. Whatever changes the reflexes of my nervous system may undergo, are changes that belong in a series other than those neutral entities to which it responds, and conversely. Nervous system and field of response do not cause each other to change; they change *with* each other. This is nothing if not parallelism, and parallelism and representationism it must be. For consider: "The little group of neutral entities which is the intersection of the 'actual town' and of 'actual space' with the recalling consciousness, and which, while remaining identically itself, is a member of both systems, has two positions,—one in the spatial manifold, and one in the conscious or knowledge-manifold." Now by virtue of these *two* positions the *identical* group may undergo changes in either which will not affect it in the other. The little group of neutral entities may be destroyed in the spatial manifold, yet remain whole in the knowledge manifold, and *vice versa.* Thus they may both be and not be at the same time. Then either idea and object are empirically different from one another, but capable by a process of verification of merging into one another, or they are the same, but immobile and indestructible, and defined differently by different "generative propositions" as "things" and "thoughts." The consequences of the latter alternative are, however, a static universe, and a rigid panpsychistic parallelism.

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[2] This JOURNAL, Vol. XII., pp. 703 *seq.*

I have said enough. That the "concept of consciousness" does not turn out complete fiction is only an indication that its author was after all too sensitive to the data of immediate experience to carry out his method implacably to the end. His book is far from the consistent deductive system he meant it to be. As it develops, its general outline gets filled with the living detail of acute observation and suggestive hypothesis; his terms regain their customary meanings, and his subject-matter its customary semblance. The passion for logic becomes checked and overlaid by an equally strong passion for fact; consistency gets swamped by correctness. The result is an imaginative distortion of reality of much beauty, some scientific worth, and great freshness and originality. To keep his system on the level of science Mr. Holt would need to acknowledge the human bias in its formulation, and to regard it simply as another instrument in the organization and control of the data of experience. He would, in a word, need to adopt the position of the pragmatists.

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